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White-Pine Weevil

by H. A. Jaynes¹ and H. J. MacAloney²

The white-pine weevil, *Pissodes strobi* (Peck), is a native insect that occurs throughout the range of eastern white pine. It is the most serious insect pest of this tree species. A large percentage of the white pines in natural stands and plantations have been attacked one or more times. The crook or fork deformations that result from the attack greatly reduce the value of the lumber (figs. 1 and 2).

Norway spruce plantations also have been severely attacked by the weevil in the East, particularly in the Adirondacks. In the Lake States, jack pine plantations are vulnerable too.

Host Trees

Tree species damaged by weevils may be grouped as follows:

Severely attacked
eastern white pine
Norway spruce
jack pine

Commonly attacked
pitch pine
red pine
Japanese red pine
western white pine
limber pine
foxtail pine

Occasionally attacked
Scotch pine
western yellow pine
mugho pine
red spruce

Rarely attacked
Himalayan pine
blue spruce
white spruce
Austrian pine
Douglas-fir

Evidence of Infestation and Damage Caused

The first evidence of attack in the spring is the appearance, on the preceding year's terminal shoot, of tiny glistening droplets of resin, exuding from holes made by the adult weevils in feeding. Larvae feeding in the leader cause the new shoot of the current year's growth to wilt and turn brown (fig. 3). This is usually noticeable by early June in the southern part of the white pine range and progressively later toward the north. Two years' growth is killed, often three, and occasionally four. Jack pine often loses only 1 year's growth because the eggs are laid in the current season's leader after height growth is well established. One of the lateral branches in the whorl below the dead leader usually assumes the role of leader, and a crook in the main stem results. Sometimes two or more laterals will compete for leadership, and a forked tree will result.

Description of Stages

The adult weevil (fig. 4, *D*) is an elongate, brownish snout beetle, about one-fifth of an inch long, and marked with irregular small patches

¹ Forest entomologist, Northeastern Forest Experiment Station, Forest Service, Upper Darby, Pa. Mr. Jaynes is located at the station's laboratory in New Haven, Conn., maintained in cooperation with Yale University.

² Forest entomologist, Lake States Forest Experiment Station, Forest Service. The station headquarters is maintained at St. Paul 1, Minn., in cooperation with the University of Minnesota.



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Figure 1.—To see how the white-pine weevil affects the quality of white pine timber, compare the tall straight stems of this undamaged stand with the stand shown in figure 2.



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Figure 2.—These white pines have been deformed by weevil attacks. When the weevils kill the leaders, the trees grow up crooked and forked.



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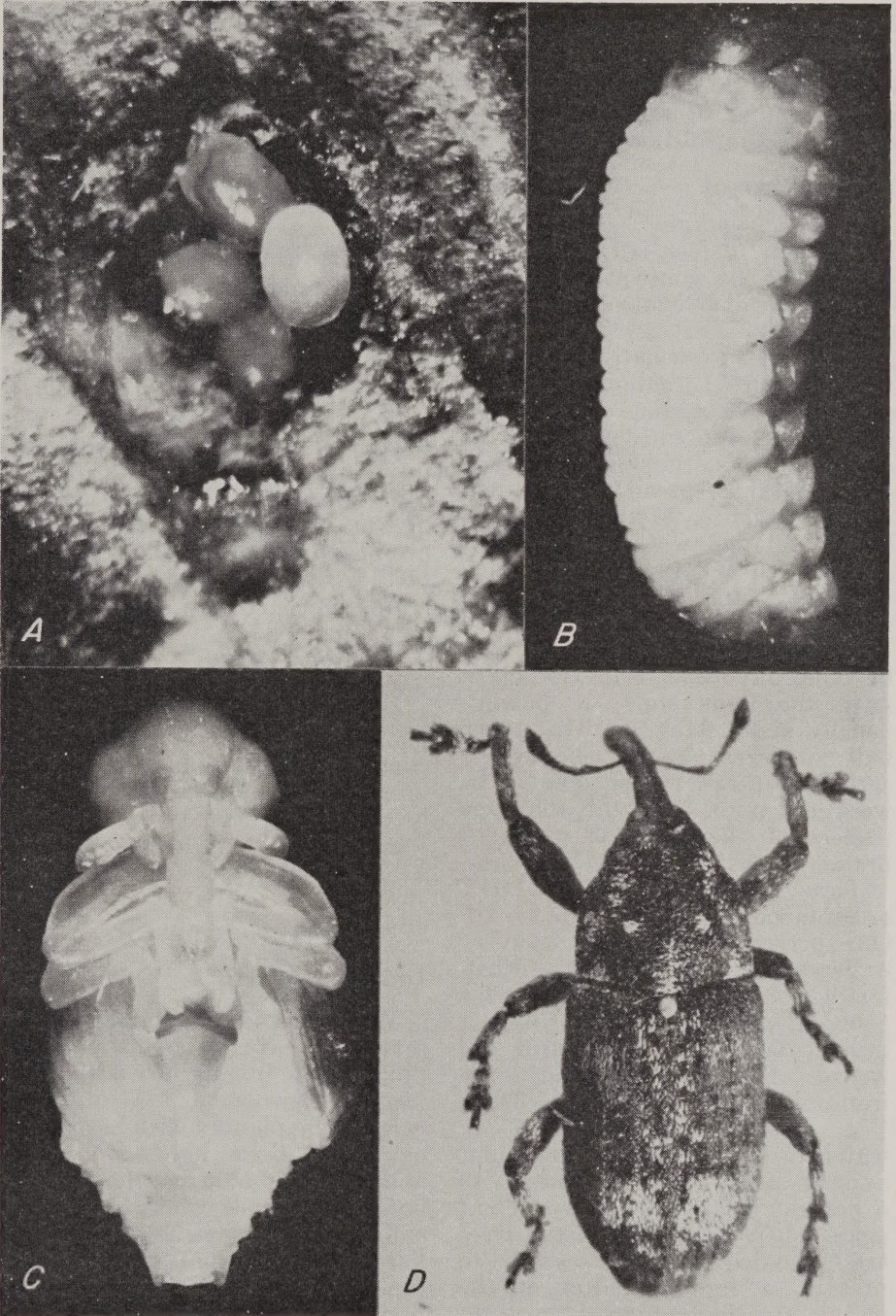
Figure 3.—The wilting top of this white pine is the most conspicuous early evidence of attack by the white-pine weevil.

of grayish-white and yellow scales. The pearly-white eggs are about one twenty-fifth of an inch long (fig. 4, *A*). The larvae are white, cylindrical, and footless (fig. 4, *B*); when full grown, they are slightly longer than the adults. The pupae are mostly creamy white and the same length as the adults (fig. 4, *C*).

Life History

The white-pine weevil passes the winter in the adult stage in the litter and resumes activity from

March to May, depending on locality. The eggs, which are laid in small punctures in the bark of the leader, hatch in a week to 10 days. The grubs, boring downward in a ring, feed on the inner bark and the outer surface of the wood as they girdle and kill the shoot. By late July the larvae become full grown, change to the pupal stage, and in 10 to 15 days become adult weevils. Adult weevils emerge from the leaders from late July until early fall.



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Figure 4.—White-pine weevil. A, Eggs laid in a puncture of the bark. Eggs are about one twenty-fifth of an inch long. B, Larva, slightly longer than adult. C, Pupa, same length as adult. D, Adult, about one-fifth of an inch long.

Natural Control

Insect parasites and predators, and also birds, at times destroy a great number of weevils, but not enough to control this pest.

Direct Control

Knapsack spraying.—In trees not more than 16 feet tall, white-pine weevil can be controlled by concentrated lead arsenate applied with a knapsack sprayer. To make 5 gallons of lead arsenate spray solution, measure $1\frac{1}{2}$ gallons of water, and stir after adding each of the following: 2 ounces (dry weight) of a common household detergent or other suitable spreader, 4 pounds of lead arsenate, 20 fluid ounces of linseed oil and water to make 5 gallons. Strain the solution into the spray tank. Use a very fine nozzle for spraying.

Spraying with lead arsenate can be done any time from December until the buds start to expand, usually about May 1. The upper half of each leader should be sprayed to the runoff point. In weeviled trees, each of the new leaders of the topmost whorl of branches must be treated.

Three percent emulsions of DDT or heptachlor will control the weevil. One percent lindane emulsion or 3 percent endrin emulsion, when fortified with the extender Aroclor 5460 (1 part extender to 1 part insecticide), also will control the weevil. Use these materials only from mid-March through April.

A new plantation must be watched closely. Apply treatment as soon as weeviling reaches 2 to 5 percent in any one year. Treat again when 10 percent of the trees are weeviled in one season, to prevent a rapid buildup of the weevil and loss of good treetops.

There is usually a 3- to 6-year period before weeviling approaches the 10-percent point, with a resulting 6 to 12 years of protection following the two treatments. During this time, enough trees will develop straight 16-foot butt logs to form a well-stocked stand.

Aircraft spraying.—Spraying large plantations by means of a helicopter has given very good control. The most satisfactory results with a helicopter were obtained when a solution or emulsion containing 2 pounds of DDT in 2 gallons of liquid per acre was applied in the spring. Experiments in spraying with fixed-wing aircraft, using 4 pounds of DDT in 4 gallons of spray per acre, also showed promise for control. However, further tests are needed before aircraft spraying can be generally recommended.

Caution: DDT, heptachlor, lindane, endrin, and lead arsenate are poisonous. Store them in plainly labeled containers, away from all food products. In handling them, follow directions and heed precautions given on container labels. In forest spraying, avoid overdosing in the vicinity of streams. Do not spray over ponds and lakes.

Indirect Control

White-pine weevil damage is less severe in natural stands of white pine grown in mixture with overtopping hardwoods. White pine can also be planted with hardwoods or under light hardwood cover. White pine should be planted only on medium soils where it will not suffer by competition from the hardwoods or from red and jack pine. If white pine is mixed with hardwoods, weedings will be neces-

sary when the stand is young and thinnings as the stand becomes older, so that the white pines can maintain optimum growth.

In stands heavily infested with white-pine weevil, the least injured trees should be selected for a final crop. The quality of these trees can be improved by pruning and their growth favored by girdling, cutting, or poisoning the less desirable trees.

References

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